

IMPACT OF CHANGE IN DIETARY BEHAVIORS AND IRON SUPPLEMENTATION FOR REDUCTION OF IRON DEFICIENCY ANEMIA IN RURAL ADOLESCENT GIRLS

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ABSTRACT

Iron deficiency, anaemia is a serious and widespread public health concern in both developing and developed countries. The Prevalence of IDA is high in developing countries, than in the developed countries due to poverty, inadequate diet, and high incidence of communicable diseases, pregnancy/lactation and low immunity. In India, adolescent girls are vulnerable group of iron deficiency anemia, resulting in a reduced physical work capacity and cognitive function, co morbidity and delay in the onset of menarche which leads to cephalopelvic disproportion. an intervention study was conducted among 300 rural adolescent girls with an objective to study the effect of change in dietary behavior's and iron supplementation for reduction of iron deficiency anemia. Results showed there was an increment of 13.55g/dl hemoglobin in the group of girls receiving the intervention. In conclusion, considering the biological feasibility and effectiveness of the intervention, supplementation of iron should be started and dietary behaviors should be improved in adolescent girls for the control and prevention of anemia and IDA in this population.

KEYWORDS: Iron Deficiency Anaemia (IDA), Hemoglobin (Hb), Adolescents, Inadequate, Dietary Intake and Prevalence

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INTRODUCTION

Adolescence is a time of increased iron needs because of the expansion of blood volume and increases in muscle mass. The incidence of iron deficiency among adolescents appears to be rising. Among adolescents, girls constitute a vulnerable group particularly in developing countries the added burden of menstrual blood loss (normal/abnormal) precipitates the crisis too often. Many adolescents are at an increased risk for anemia due to their rapid growth. However, adolescent females with heavy menstrual bleeding are at an even greater risk for anemia. Heavy menstruation in adolescent females not only has negative effects on health-related quality of life and school attendance, but also has major health implications such as iron deficiency anemia. Many of teenage girls do not meet the Recommended Dietary Allowance (RDA) for iron due to dietary pattern. Adolescence is a vulnerable period in the human life cycle for the development of nutritional anemia. Anemia has a negative effect on cognitive performance in adolescents. Choudhary, et al. reported two-thirds of the anemic adolescents in community were suffering from iron deficiency anemia (IDA). In a study by Patra, et al. on severely anemic adolescents admitted in a tertiary care hospital, megaloblastic anemia was the most common type of anemia

(42.5%) and iron-deficiency accounted for 15% cases.

REVIEW OF LITERATURE

Malhotra and Passi (2004) studied the haemoglobin status of adolescent girls in rural areas and reported that the incidence of mild, moderate and severe anemia was found to be 50 %, 44.4 % and 2.8 % of the subjects and only 2.8 % of subjects had normal haemoglobin level.

Shekhar (2005) conducted a study on iron status of adolescent girls and its effect on physical fitness. Background information, anthropometric measurements, dietary intake and menstrual history were recorded. Out of 150 subjects, 68 students were found to be normal, although none were observed to be severely anemic ($Hb < 7$ g/dl); 12.6 % and 46 % subjects were moderately and mildly anemic, respectively. Approximately 74 % girls with moderate anemic, approximately 28 % girls with mild anemia were correctly identified when pallor of conjunctiva, eyes and tongue was used to examine and assess anemia. The sensitivity of identifying girls with symptoms like weakness, tiredness, irritability and breathlessness for moderate, mild and severe anemia was 61 % and 20 %; respectively. The mean age of menarche was 13 years and the menstrual cycle was regular among 75 % of adolescents. Mean daily iron intake was observed to be less than 50 % of the RDA, whereas the ascorbic acid intake was adequate, leading to many adolescent girls having normal hemoglobin levels in spite of iron consumption being less than RDA

Kumar et al. (2006) conducted a study on influence of family's vegetable cultivation on prevalence of anemia among adolescent girls. The objectives of the study were to assess whether the cultivation of vegetables in families benefits the adolescent girls in terms of vegetable consumption and maintaining normal hemoglobin levels; and whether the prevalence of anemia varies in vegetable grower and non- grower families. The research revealed that the vegetable growers commonly cultivated leafy vegetables like soya, spinach, amaranths and onion stalks. About 15 % of the families produced vegetables for their own consumption. The remaining had surplus quantities, which were either sold or fed to the animals. Preservation was not at all practiced for any leafy vegetable. In VG group 62.5 % girls consumed green leafy vegetables daily and the remaining consumed 4-6 times per week. The average quantity consumed was higher in the VG groups than in their NVG counterparts.

Kotecha et al. (2002) conducted a study on adolescent girl's anemia reduction programs – impact evaluation. The objectives of the survey were to measure the anemia prevalence and hemoglobin level of the school girls and measure the change due to intervention, to study the utilization of informational and educational counseling material and to study the consumption of iron rich and Vitamin C rich foods, and to evaluate the supplementation compliance of the school girls and out of school girls using existing school based records and self-reporting by the girls. The intervention was more successful among adolescent girls in rural areas than in tribal areas though even in the tribal areas the reduction in prevalence of anemia was substantial. Thus, there is a need for modification of intervention strategy and methodology for tribal areas, as per the local socio-cultural context. Even though consumption of Vitamin C rich foods improved among adolescent girls, yet greater effort would be required to promote consumption of iron rich foods for long term gains in iron status of the girls.

OBJECTIVE

To study the impact of knowledge, attitude and practice on anemia, of the rural adolescent girls.

METHODOLOGY

Samples of 70 adolescent girls in age group of 13-16yrs were randomly selected from rural Telangana district.

Table 1: Hemoglobin Levels of Adolescent Girls Pre-and Post-Intervention

Hb- Levels		13Yrs		14Yrs		15Yrs		16Yrs	
		Pre	Post	Pre	Post	Pre	Post	Pre	Post
Severe	<8	10	3	11	5	8	-	3	-
Moderate	8-10.9	55	11	65	16	16	6	14	4
Mild	11-11.9	14	45	24	35	27	25	6	8
Normal	>12	7	27	12	46	-	20	-	11

The hemoglobin levels of rural adolescent girls before and intervention was presented in the table above. The study results indicate that in 13yrs age group 10 had severe anemia, 55 moderate, 14 mild and 7 were normal before intervention. After nutritional intervention the number of rural girls with normal range of hemoglobin were 27, while 45 had mild anemia, 11 moderate and only 3 rural girls had severe anemic. Thus the intervention helped to decrease the number of anemic cases. In 14yrs age group of rural adolescent girls before intervention 11,65 and 24 were in severe, moderate and mild anemia, while only 12 girls were having normal levels of hemoglobin. After intervention, the levels of hemoglobin increased and 46 of them had normal levels while still 35 of them had mild anemia, 16 moderate and 5 were in severe anemic condition. In age group of 15 years 8, 16 and 27 were placed in severe, moderate and mild levels of anemia, but after intervention, 20 of them gained normal hemoglobin levels, while 25 had mild and 6 moderate anemia. In the 16 years age rural adolescent girls before intervention 3 had severe, 14 moderate and 6 mild while none of them had normal levels of hemoglobin. After intervention, 11 had normal levels while, 8 mild and 4 moderate anemia.

The study concludes by changing the attitudes, practices and increasing the awareness levels on iron rich foods, importance of eating dark green leafy vegetables to maintain hemoglobin especially in adolescent girls, it was noted that intervention had positive impact and increased the hemoglobin levels of the rural adolescent girls. But still few of them had severe anemic condition specially 13 and 14yrs age group.

Table 2: Mean Differences in Hemoglobin Levels Pre-and Post Intervention

Age	Pre	Post	T- Value	P Value
	Mean± SD	Mean± SD		
13yrs	9.2±1.28	12.23±1.5	5.07	0.001**
14yrs	9.2±1.14	12.02±1.6	6.308	0.001**
15yrs	9.1±1.60	11.98±1.7	3.11	0.002**
16yrs	8.9±1.30	11.88±1.1	1.68	0.05*

The pre-post intervention comparisons of mean hemoglobin levels of rural adolescent girls in age group 13-16yrs was presented in the table 2. The t test reveals that there is significant difference between the pre and post hemoglobin levels of rural adolescent girls in all the age groups under study. It could be concluded that the intervention had a positive impact in decreasing anemia among the rural adolescent girls. In a similar study by Vyas S(2010) concluded that Leaf concentrate is an effective, and more palatable, alternative to Fe and folic acid supplements for treating anemia in adolescent girls. At the end of the intervention, he found that none of the eighty-six remaining girls were severely anemic, nine (10.5 %) were moderately anemic and twenty-six (30.2 %) were mildly anemic; fifty-one (59.3 %) had normal Hb levels (> or = 12 g/dl). After adjustment for baseline values, LC was as effective as IFA in improving serum Fe parameters and treating anemia.

CONCLUSIONS

Iron deficiency anemia is a widespread deficiency in adolescents of developing countries. Iron requirements are increased during adolescence, reaching a maximum at peak growth, and remaining almost as high in girls after menarche to replace menstrual losses. Adolescent iron requirements are even higher in developing countries because of infectious diseases and parasitic infestations that cause iron loss, and because of low bioavailability of iron from diets limited in heme iron. Low iron status among adolescents may limit their growth spurt. The present study shows that by increasing the awareness levels, knowledge and practices of eating dark green leafy vegetables and other food based strategies the hemoglobin levels of rural adolescent girls can be increased.

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